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Issue Briefing Paper

United States Department of Agriculture

Date: AUGUST 21, 1979

NO. 20

Title: SCS ANSWERS CRITICS OF NEW SOIL AND WATER DATA

THE NUMBERS CONTROVERSY--BACKGROUND

New data on average soil losses published by the U.S. Department of Agriculture's Soil Conservation Service are worrying many conservationists.

Reporting the first results of a three-part study of natural resource conditions, SCS says the average soil loss on cropland from surface erosion by water is 4.8 tons per acre per year. This figure is about half that of an earlier estimate and one ton less than the average loss reported by SCS 10 years earlier.

Critics of the 4.8-ton national average, including several conservation district spokesmen, fear it will mislead people into believing soil erosion is no longer a problem.

Soil scientists say an annual soil loss of about 4 tons per acre is "permissible" for many soil types, since at that rate new soil can be created about as fast as soil is lost. Some critics wonder if SCS specialists didn't make several "honest mistakes" in obtaining and analyzing their data.

SCS has checked and rechecked its data, collected by its field technicians at more than 200,000 sample points during the summer of 1977. As a result, SCS remains convinced the data are reliable and will guide conservationists in carrying the fight against erosion to those areas that need it most.

Ray A. Dideriksen, who is directing the new study, called the National Resource Inventories, said the 4.8-ton national average includes highly erodible soils and soils that hardly erode at all.

The inventories reveal, for example, that regional losses of cropland soil range from a high of 10.6 tons per acre per year in the Appalachian states to a low of 1.3 tons per acre in the Pacific Coast states. The Corn Belt, where much of America's row crops are grown, has an average loss of 8.1 tons per acre per year, about twice the "permissible" rate.

"All mean averages," Dideriksen said, "are tools of limited usefulness."

Nevertheless, some conservation spokesmen are worried that, at a time when pressures on the land are increasing, the public will attach too much importance to the 4.8-ton average figure and turn its back on needed soil conservation programs.

And that, according to Secretary of Agriculture Bob Bergland, would start the nation "on a collision course with disaster."

NEED FOR THE NRI

The 49-state National Resource Inventories were begun by SCS early in 1977 to meet demands for current data on soil, water and related resources on nonfederal land.

Alaska was not included in the inventories because it has relatively little farmland. Puerto Rico and the Virgin Islands were included.

SCS's last comparable survey, the Conservation Needs Inventory, made in 1967, was out of date.

For one thing, new data were needed to modernize the nation's 45-year-old soil and water conservation program. Public Law 95-192 (Nov. 18, 1977)--the Soil and Water Resources Conservation Act--provides a mechanism for recommending program changes. Sound recommendations need to be based on facts about resource conditions that are complete, reliable and up-to-date.

For example, how fast is soil eroding? What kind of soil is most vulnerable to erosion? How much conservation treatment is needed? How much farmland is being lost to development? Will new cropland be more susceptible to erosion?

These and other questions are being answered by the three-phase National Resource Inventories. Phase 1 has already been released. Phase 2, on gully, stream and roadbank erosion, will be released late in 1979; phase 3, on sedimentation, in 1980. It is some of the phase 1 findings that are worrying conservationists.

The chief tool in estimating soil losses in phase 1 of the inventories was the Universal Soil Loss Equation. The equation was developed over many years by Walter H. Wischmeier, formerly of Purdue University.

The equation predicts soil erosion rates through combinations of the following factors: soil erodibility, rainfall, slope length, slope steepness, plant cover and conservation practices used on the land.

A numerical value is assigned to each of the factors. They are then multiplied together to give an erosion-rate--usually expressed in tons of soil lost per acre per year. Some wonder if the equation, which was developed for midwest and eastern states, is truly "universal."

SPECIFIC QUESTIONS AND CRITICISMS

In particular, critics of the inventories question the validity of using the Universal Soil Loss Equation to estimate erosion in the arid West, where rainfall, the dominant component of the equation, is sparse, and where much of the water comes from snowmelt in the mountains.

SCS agrees that the equation was developed for states with more rainfall but explains that agency scientists modified the equation for the West to take snowmelt into account. It is true there has been less experience with the equation in western states than in the East. Nevertheless, the equation is still the most reliable method for estimating soil erosion.

Critics of the inventories maintain also that data on irrigated land should have been removed from state and national averages on sheet and rill erosion--surface erosion by water--since there is no factor for irrigation water in the Universal Soil Loss Equation.

SCS agrees that the management of irrigated land does not fit easily into the equation. The agency made an additional computer run on sheet and rill erosion by regions, separating irrigated from nonirrigated land. Removing the irrigated land did indeed push up the national erosion average on nonirrigated cropland--but only by one-third of a ton. The figure was somewhat more than that in the Pacific States, Mississippi Delta and Southeast but no regional average was increased by as much as a ton.

Another question raised about erosion averages was whether including pasture in the cropland acreage had the effect of keeping the erosion average artificially low.

SCS replies that while the inclusion of pasture does reduce the average, it depresses it only slightly. If everything except row crops were removed from the calculations, the national erosion average would rise from 4.8 tons per acre per year to 5.2 tons per acre. Both figures--with and without pasture--would round to 5 tons per acre.

"Even when we take all the objections of our critics into consideration," says Dideriksen, "the difference in the erosion figures is very small. SCS stands behind the phase 1 data."

OTHER IMPORTANT FINDINGS

Unfortunately, debate over the size of erosion averages has overshadowed other important findings of the National Erosion Inventories. One example is the relation of soil erosion to land capability class.

SCS uses so-called capability classes to show, in a general way, the suitability of soils for most kinds of field crops. Classes are designated by Roman numerals I through VIII, with Class I land the best suited to growing crops and Class VIII the worst. The higher the number, the greater the soil erosion if field crops are planted.

The inventories reveal that annual soil losses on Class I cropland average only 3 tons per acre. On Class III cropland, the losses climb to 6.9 tons per acre. On Class VI, which has "very severe limitations for cultivation," the losses average 14.9 tons per acre.

The lesson for farmers in these figures is to avoid planting crops on erosion-prone acres unless adequate conservation is applied. Land in Classes VI, VII and VIII should not be cropped at all.

There is a danger, however, that increased world demand for U.S. crop production will tempt growers into planting crops on steep, hard-to-protect land. Then erosion figures will start to climb.

Farmers also could be trapped into growing crops on marginal lands as better croplands are swallowed up by urban expansion. The inventories confirmed previous estimates that homes, factories, roads and shopping centers are taking rural land at the rate of about 3 million acres per year. About one third of this total is America's better cropland.

OTHER NRI HIGHLIGHTS

--Average annual soil loss from wind erosion on cropland in the 10 Great Plains states is 5.3 tons per acre per year. Three of the 10 states--Colorado, New Mexico and Texas--have rates above 8 tons per acre.

--Some 892 million acres of agricultural and forest land need conservation treatment.

--Acreage of irrigated land went up from 47 million acres to 62 million acres between 1967 and 1977.

--Land available for grazing has increased sharply, rising 34 million acres over the last decade, from 507 million acres to 541 million acres.

CONCLUSIONS

SCS stands behind the reliability of Phase 1 of the National Resource Inventories. The data will be used with other facts and figures in developing appraisals, evaluations and program recommendations required by the Soil and Water Resources Conservation Act of 1977.

At the same time, SCS cautions against planning present and future conservation programs on the basis of the 4.8-ton soil loss average. That would make as much sense as for a clothing manufacturer to make all his suits fit an average-sized customer or for a pilot to base his coast-to-coast flight altitude on the average national elevation above sea level.

What the complete inventory data does make clear is that soil erosion continues to be a resource problem of major proportions and that we need more effective, targeted programs to correct the problem.

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